

Effectiveness of Electronic Governance in Crisis Management

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Abstract. The research focuses on the role of electronic governance (e-Governance) in crisis management, highlighting the COVID-19 pandemic. Through a literature review and case studies analysis from various countries, including data on Bulgaria, this article explores how technologies support effective crisis management and offers ways to optimize electronic solutions in future crisis management strategies. The research methods include a qualitative analysis of data from publicly available sources, government reports, academic articles, and statistical data to identify successful practices and challenges in implementing electronic governance across different sectors during crises. The results show that Bulgaria has made significant progress in adapting and adopting electronic governance in response to the pandemic, highlighting the importance of technology in maintaining administrative functionality during crisis periods. The specific example of Chile, along with the Bulgarian experience in managing the pandemic, demonstrates the potential of technological solutions. The conclusions emphasize the need for developing flexible, scalable, and secure technological solutions for electronic governance, focusing on improving digital skills and infrastructure. Electronic governance has been identified as a key tool for crisis management that should be integrated into strategic crisis management plans. Future efforts should be directed towards enhancing technological platforms and developing innovative solutions for the resilience and efficiency of societies in crisis conditions.

Keywords: *e-Governance, COVID-19, Crisis Management*

I. INTRODUCTION

In today's world, where we often face various forms of crises, from natural disasters to global health threats, effective management of these situations is essential to maintain stability and safety in society. The focus of this research paper is on the analysis of the role of e-Governance during crises, with a specific emphasis on the

consequences of the COVID-19 pandemic. The article provides an objective view of how technology can support and improve the effectiveness of crisis management through an analysis of existing practices and successful examples.

With this scientific article, we aim to contribute to the enrichment of knowledge in the field of crisis management by providing analysis, recommendations and perspectives for the future. In the following sections, we will look at specific examples and aspects of e-Governance in times of crisis in order to highlight the importance and opportunities that technology provides in this context. In addition to reviewing international practices and successful examples, this analysis includes specific data on Bulgaria, illustrating the application of electronic governance in response to the COVID-19 crisis. Thus, by combining an international review and national analysis, this article offers a comprehensive perspective on the opportunities and challenges associated with the effectiveness of electronic governance during crises.

II. MATERIALS AND METHODS

The study of the effectiveness of e-Governance in crisis situations is based on strategically selected qualitative methods and a variety of sources. The approach includes analysis of scientific articles, government reports, and specific case studies, with a focus on real data from Bulgaria to illustrate key observations and conclusions. This methodology allows us to assess the direct impact of the electronic governance on crisis management and to derive comprehensive recommendations for its future development and application. Few people think that the presence of e-Governance is especially important during a crisis. In addition to the fact that the crisis (be it

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natural, financial, political, health or other) usually leads to a lower purchasing power of citizens, it almost always results in a sharp contraction of public spending, or, in other words - if we try to realize certain public policies – social, educational, etc., we will just have to be able to do it with less money. One of the main characteristics of e-Governance is that it saves money and optimizes processes, which is one of the prerequisites to consider that the role of e-Governance is particularly important in crises situations, and even to some extent a crisis is a catalyst for the development of e-Governance because otherwise there is no way to achieve the same effect with the available resources spent inefficiently [1].

A crisis can hit us in the most diverse ways – closing down productions, shrinking job positions, civil unrest, etc. In fact, in each of these situations e-Governance can play a certain positive role, as long as we are able to use it to its full potential. For example, when factories are closed or jobs are downsized, appropriate systems developed within e-Governance can assist us in finding work. At the same time, the companies or institutions where the layoffs are taking place will have to continue to function, and for this purpose the reduced staff should be able to perform the same amount of work, for which again electronic governance comes to the rescue. There is a certain objective logic in accelerating the pace of e-Governance penetration when the economic situation worsens, since in practice it is a kind of medicine against crises, but of course, it is by no means a panacea and cannot solve every specific situation. It is important that society realizes and accepts its key role in the reengineering of processes that invariably accompanies e-Governance, while transparency and publicity, which are also inherent in e-Governance, play an important role in calming public opinion, making the whole society complicit with what is happening [1].

Chile is one of the most disaster-prone countries because it lies on a “ring of fire” tectonic plate. The 8.8-magnitude earthquake that struck there in 2010 was the world's sixth largest since 1900. In the aftermath, the Chilean government took progressive steps toward establishing a tsunami early warning system. A network of pressure sensors has been installed near the main fault lines between Peru and Chile. The sensors detect the number of seismic events and the software estimates the magnitude and epicenter. An algorithm analyzes and interprets the data before passing it on to alert centers. Early warning messages are broadcast over the mobile phone network [2].

The importance of electronic governance significantly increases in crisis situations caused by natural disasters, health crises, or socio-economic changes, often aiding in maintaining social stability and the efficiency of public services. Especially during a crisis, when resources are limited, electronic governance offers opportunities for process optimization and cost savings. The example of Chile and the development of a tsunami early warning system following the 2010 earthquake illustrates how technological solutions can save lives and reduce economic losses. Thus, electronic governance not only facilitates the management of immediate crisis situations but also supports the long-term adaptation of societies to changing conditions, playing a key role in overcoming challenges and building more resilient socio-economic systems.

III. RESULTS AND DISCUSSION

In the context of global crises, the effective and adaptive management becomes not only a challenge but also a crucial factor for survival and recovery. In this section, our research reveals how electronic governance emerges as an important tool in crisis management, with a special focus on the COVID-19 pandemic. We have examined the significance of technological innovations and digital integration in the context of crisis response, highlighting how the COVID-19 crisis has pointed out the need for accelerated development and application of electronic solutions in public administration. Additionally, we have analysed the role of electronic governance as a catalyst for socio-economic adaptation. The aim of this section is not only to provide an objective analysis of the observed phenomena but also to offer recommendations that can serve as a basis for formulating future strategies for electronic governance. The intention is to emphasize the potential of the electronic governance not only as a means to cope with current crises but also as a crucial element in strategic planning for sustainable and innovative management of society. Through this discussion, our aim is to contribute to the expansion of knowledge about electronic governance as a tool for sustainable and effective crisis management, offering recommendations that can improve its effectiveness in future emergencies.

The COVID-19 crisis has played a key role in accelerating business processes and promoting innovation in various fields. The pandemic has become a catalyst for changes that include not only adaptation to new realities, but also the adoption of technological transformations. The COVID-19 crisis, instead of being only a challenge, has become an opportunity for innovation and progress, with changes in business processes and the adoption of new technologies becoming inevitable for sustainability and development. The outbreak of the COVID-19 pandemic in early March 2020, followed by a lockdown, created new pressures from both institutions and citizens to deepen and accelerate e-Governance reforms to ensure continuity of work processes and the provision of public services. This has led several institutions that previously considered e-Governance to be a low-priority issue to express an increased interest in reforms to ensure their resilience to possible future crisis shocks [3].

The COVID-19 pandemic has caused serious challenges for administrations around the world, necessitating the need for innovative and effective management methods. According to the data in the reports [4], [5] of the United Nations study on the development of e-Governance during the period of the COVID-19 crisis (2020-2022), information and communication technologies (ICT) played a key role in supporting health and safety of people and in ensuring the functioning of economies and societies. The pandemic has highlighted the importance of e-Governance as a means of improving services to society and accelerating the achievement of sustainable development goals. E-Governance technologies have kept governments and citizens connected during the pandemic by sharing information and delivering services electronically. This has enabled governments to make rapid policy decisions based on real data and

analyses and to increase the capacity of local authorities for better coordination and service delivery. Governments shared information through their national portals, mobile apps and social networks. A review of the national portals of the 193 members of the United Nations reveals that governments have shown a high level of transparency in providing information related to the crisis. Some governments have shown great flexibility by developing dedicated COVID-19 portals and government apps, providing continuously up-to-date information and resources to combat the pandemic “Fig. 1”.

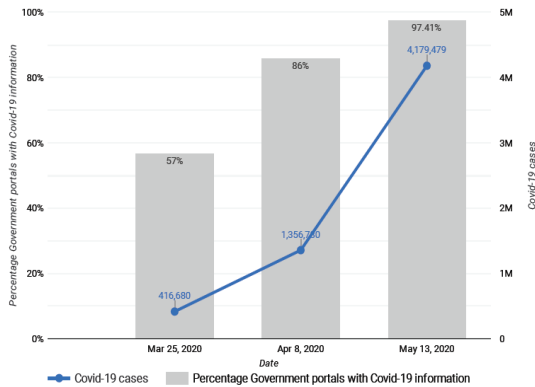


Fig. 1. Percentage of Government portals with COVID-19 information and world total confirmed COVID-19 cases [4] – [8].

A review of the national portals of 193 United Nations Member States showed that as of 25 March 2020, only 57 percent (110 countries) had provided any information on COVID-19. The percentage of countries providing such information and guidance reached approximately 86 percent (167 countries) as of April 8, 2020. Finally, as of May 13, almost 97.5 percent (188 countries) already had information about COVID-19 in their national portals [4].

Innovations, including the use of artificial intelligence, blockchain and robotics, have contributed to the fight against the pandemic and highlighted the need for effective, inclusive and accountable digital governance. In the future, strategies should focus on improving data protection and global digital inclusion by strengthening the political and technical capacities of public institutions. At the same time, challenges such as information security and disinformation require responsible and concerted efforts by governments.

The analysis of data from recent years in Bulgaria shows a significant increase in the number of joined administrations in 2020 and 2021 “Fig. 2”. This period is characterized by rapid adaptation to electronic solutions, which play a key role in maintaining the functionality of administrative systems during a crisis.

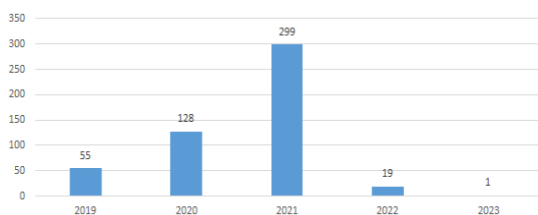


Fig. 2. Administrations that have joined the Single Model. The data is current as of 02/20/2024 [6].

The year 2021 stands out as a period with an extremely high number of developed electronic services “Fig 3”. This fact emphasizes the commitment to the improvement of electronic platforms and the provision of innovative solutions.

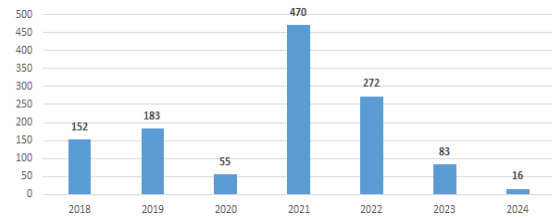


Fig. 3. Number of services developed under the Unified Model. The data is current as of 02/20/2024 [6].

The significant increase in interest and requested services during the pandemic reflects the active role of e-Governance in providing the necessary resources and information to citizens. The reduction of this number in 2024 can be interpreted as a consequence of a certain standard being reached in the provision of electronic services “Fig. 4”.

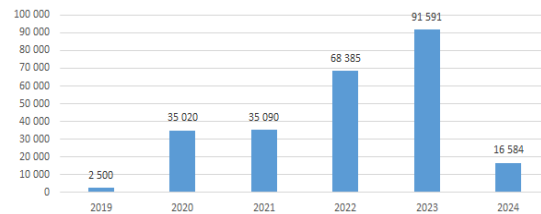


Fig. 4. Requested electronic services through the Unified Model. The data is current as of 02/20/2024 [6].

In the context of contemporary education and management of educational institutions, the electronic governance plays a significant role as a tool for supporting and optimizing various aspects of the educational process. Electronic governance was essential in coping with the crisis during the COVID-19 pandemic. By implementing distance learning in educational institutions, electronic governance allowed these institutions to continue functioning while there were restrictions on everyday activities. In Bulgaria, education was the first sector to mobilize after the announcement of the pandemic. Within 4 days of the announcement of the national quarantine, schools introduced distance learning, which covered large cities, rural areas and vulnerable groups. A non-governmental Roma organization [7] conducted a survey during the first days of the quarantine to assess the class attendance of students in 200 schools that educate children from vulnerable groups and schools that work with children whose parents have a relatively high level of education and social status. The results of the survey showed that the proportion of students participating in distance learning was promisingly high. Over 36% of schools surveyed were able to reach between 75% and 100% of their students through various forms of distance learning in the first 3 days. The percentage of schools that recorded low student participation in the first days was 6.6%. Two-thirds of schools combine internet-based techniques (giving assignments via Skype, Messenger,

etc. or e-classes on platforms such as Zoom) with printed assignments and paper lessons distributed by school mediators. The remaining one-third (32 percent) of schools use only Internet-based techniques. Among the identified obstacles to online learning is lack of appropriate devices - only in 22.34% of the schools more than 90% of the students have appropriate devices.

CONCLUSIONS

In conclusion, the present study highlights the significant role of the electronic governance in the context of crisis situations and emphasizes how appropriately integrated technologies can facilitate effective management in the face of disasters and threats. The analysis, based on a detailed examination of cases such as the COVID-19 pandemic and early warning systems in Chile, clearly illustrates how innovations in electronic governance help address the challenges associated with such emergencies. The review of successful practices and examples of crisis management aims to highlight the opportunities that technologies provide for optimizing the responses of society and institutions. Special attention has been paid to the example of Chile, from which valuable lessons can be drawn on building effective early warning systems based on sensors, software, and mobile communications. This observation supports our findings on the importance of electronic governance as a critical resource for maintaining public functionality and safety during crises. We have highlighted that electronic governance not only saves resources but also represents a key tool for overcoming challenges related to crisis situations. In conditions of economic instability or when rapid adaptation is required, electronic governance technologies offer some important solutions for process optimization and maintaining functionality of institutions. To move forward, it is essential to integrate new technologies such as artificial intelligence, blockchain, and robotics into electronic governance strategies. This will help in more flexible and rapid responses to emergencies. It is also crucial to invest both in electronic governance infrastructure and the improvement of staff training, which will ensure a smooth operation of systems during crises. Information security remains a priority, with effective data protection measures and counter-cyberattack strategies being essential for the continuous stability of electronic systems. Finally, strategies for improving access to electronic services for various social groups are critical for ensuring sustainable and effective management during crises. With collaborative efforts and an innovative approach, we can strengthen the resilience and efficiency of our societies in the face of future challenges.

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